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SESSION 5. CAMELID ECONOMY AND SOCIO-CULTURAL ASPECTS

USE OF DEMOGRAPHIC MODEL TO ASSESS THE POTENTIAL CHANGE IN CAMEL POPULATION. THE EXAMPLE OF SAUDI ARABIA

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Abstract

The model de Leslie (matriciel model based on the monitoring of cohort) is the most model used for assessing the dynamic of population. Such model was used for assessing the population projection for the next 10 years based on the fixed in (birth and purchase) and out (mortality and culling) parameters as well as the reproduction items (fecundity, abortion rate). Different scenario based on this model can be tested and the effect of mortality rate improvement or increasing reproduction performances can be assessed on the population dynamic. Moreover, the economic values of the camel industry (selling milk and culled animals for slaughtering) can be assessed at the national level. For example by improving survival rate of 0-1y calves from 84 to 90%, the annual growth rate of the herd population will pass from 2.53 to 2.69%. Many examples are given in the presentation.

Keywords: Camel demography, model, economic assessment, camel productions

ТҮЙЕЛЕР ПОПУЛЯЦИЯСЫНЫҢ ПОТЕНЦИАЛДЫ ӨЗГЕРУІН БАҒАЛАУДА ДЕМОГРАФИЯЛЫҚ МОДЕЛДІ ҚОЛДАНУ. САУД АРАБИЯСЫ МЫСАЛЫНДА.

Де Лесли моделі (жиынтық мониторингіне негізделген модель) популяция динамикасын бағалауға арналған жиі қолданылатын модель болып табылады. Мұндай модель демографиялық бағалауды бекітілген ішкі (туылу және қалыптасу) және сыртық (өлім және жарамсыздық) көрсеткіштер, сондай-ақ өнімділік элементтерінің (өнімділігі, түсік тастау деңгейі) негізінде алдыңғы 10 жылға болжам жүргізуге қолданылған болатын. Осы модель негізінде түйелер санының артуы, олардың өлім жылдамдығын төмендету сияқты түрлі жағдайларды бағалауға болады. Сонымен қатар, түйе өнімінің (сүтін сату, союға арналған малдарды дайындау) экономикалық құндылығын ұлттық деңгейде бағалауға болады. Мысалы, 0-1 жастағы боталардың өсуін 84-тен 90%-ға дейін, үйірдегі түйелердің санын 2.53-тен 2,69%-ға дейін арттыруға болады. көптеген мысалдар презентацияда көрсетілген.

Түйін сөздер: Түйе саны, модель, экономикалық бағалау, түйе өнімділігі

ИСПОЛЬЗОВАНИЕ ДЕМОГРАФИЧЕСКОЙ МОДЕЛИ ДЛЯ ОЦЕНКИ ПОТЕНЦИАЛЬНОГО ИЗМЕНЕНИЯ В ПОПУЛЯЦИИ ВЕРБЛЮДОВ. ПРИМЕР САУДОВСКОЙ АРАВИИ

Модель де Лесли (модель основанный на мониторинг когорты) является наиболее используемой моделью для оценки динамики популяции. Такая модель была использована для оценки демографического прогноза на ближайшие 10 лет на основе фиксированного внутренних (рождения и приобретения) и внешних (смертности и выбраковки) параметров, а также элементов производимости (плодовитости, уровень абортов). На основе этой модели могут быть проверены различные сценарии и эффект улучшения скорости смертности или расширенного производства выступления могут быть оценены на динамику численности населения. Кроме того, экономическая ценность верблюжьей промышленности (продажа молока и выбор животных для убоя скота) может быть оценена на национальном уровне. Например, путем улучшения выживаемости верблюжат 0-1 годичного возраста от 84 до 90%, темпы роста населения стада будет проходить от 2.53 до 2,69%. Многие примеры приведены в презентации.

Ключевые слова: Верблюд демография, модель, экономическая оценка, верблюда производств

Introduction

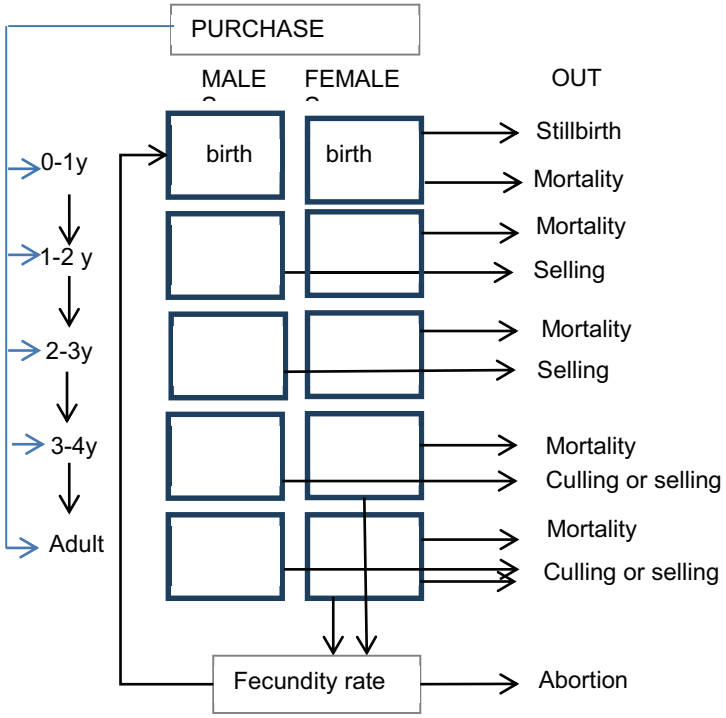
Demography is a key determinant of the livestock production. The estimation of the demographic rates is necessary to assess the impacts of management or veterinary interventions on herd production or to assess the livestock population dynamics under different scenarios. In a herd or in a country, the animal demography is based on similar parameters (Lesnoff et al., 2011): the initial composition by sex (female and male) and age class, the animal inputs (birth, purchase for a herd or import for a country, eventually gift or heritage) and animal outputs (mortality, culling or selling in herd, or export at country level). In each sex, different age classes could be determined but a usual classification considers three age classes: juveniles/=, sub-adults and adults with defined length according to the species and to the farming management traits (Lesnoff, 2008). With this classification, only the adult females are assumed to be reproductive. The distribution of males and females in the juvenile group at birth is depending of the sex ratio and the number of animals passing from one age class to another is depending of mortality rate, birth rate, culling rate, offtake/intake rate and at country level, import/export volume. In the present communication, the applications used in our camel farm and at country level (Saudi Arabia) are briefly presented.

Materials and methods

Two tools are used for the present demographic assessment of camel stock. The models used in the present communication are deterministic. The first application was developed for assessing the potential growth and potential incomes of the camel farm at Conservation and Genetic Improvement Center (CGIC) in Saudi Arabia. The second

application used the tools developed by CIRAD (France) for assessing the economic performances of the livestock in a given country (Lesnoff, 2013).

(i) Farm-level application. The parameters of the models are determined by the user (for example mortality or pregnancy rates), based on the data collected within routine farm monitoring of the FAO camel project in Saudi Arabia. The time-interval used in herd-level computation was the year leading to the lack of representation of potential seasonal variation although its important feature in camel reproduction. However, the reproduction cycle in camel being roughly two years (one year gestation, one year lactation, two years of calving interval), the year-interval could be regarded as convenient. Due to the long live span of camels, the age classes were divided in 0-1, 1-2, 2-3, 3-4 years (sub-adults) and adults. In projection over several years, the variability of environment is not taking in account with the present models used: impact of resources (feeding, water,…), diseases or economic constraints (market's prices).



The model is based on the decomposition of the demographic events as schematically represented in the figure 1. The number of twins being exceptional in camel species, the prolificacy rate is regarded as equal to calving rate. The ranges of the different retained parameters in the model are the followings: calving rate (number of calving/number of pregnant females): 80-90%; Abortion rate (1-calving rate); sex ratio (number of females/number of males): 80-120; mortality rate 0-1 y: 5-30%; mortality rate 1-2 y: 0-15%; mortality rate 2-3 y: 0-10%; mortality rate 3-4y: 0-5%; mortality rate adult: 0-5%; pregnancy rate (number of pregnant/number of mated females within a year): 70-95%; culling rate for male according to age class: 5-60% and for female 5-15%; Mean lactation length: 300 to 400 days. The application includes also economic parameters as annual milk productivity growth (1 to 10%), the mean individual daily milk production (5 to 10l), milk price (7-10 SAR in Saudi Arabia), price of culled animals (2500-6000 SAR), annual inflation (2.5-3% in Saudi Arabia), % of milk sold (50 to 100% according to the importance of processing). The farm application was built on Excel table and the demographic projection was done on 10 years.

(ii) Country-level application: the Steady-one tool (Lesnoff et al., 2008) was used. The data regarding the national level were assessed from different local surveys on camel farming systems (Abdallah and Faye, 2013). The herd composition at the origin (juveniles, sub-adults and adults) was estimated to be 9, 15.5 and 43% respectively for females, and 7, 8 and 13% respectively for males. The calculations were based on a total camel population of 280,000 heads (FAOstat, 2014).

Results and discussions

The farm model helps to assess the impact of the improving management (decrease mortality rate, increase pregnancy rate, better culling or offtake management, increase milk productivity) on the numerical productivity or on the farm incomes. For example, with 90% pregnancy rate, 10% abortion, 50% offtake rate for young males and 10% culling for adult females, sex ratio 100, the herd growth over 10 years was 3.7% if mortality rate in 0-1y age class is 20%. This growth was 4.05% with 10% and 4.15% with 5% mortality in the young class. Based on 10% mortality in 0-1y age class, the annual camel herd growth changed from 1.38 with 70% pregnancy rate, 3.16 with 80% and 3.7 % with 90%. The impact of pregnancy rate appears more important than the mortality rate on the milk incomes: the benefit over 10 years is multiplied by 10 with 90% pregancy rate *vs* by 7 with 80% while the improvement of mortality rate 0-1y from 20 to 10% did not change significantly the expected milk incomes.

By using Steady-1 application at country level, with an objective of 2% annual growth and based on fecundity rate (number of pregnant/total number of reproductive females) 45% per year, sex ratio 100, offtake 0, 2 and 6% per age class for females and 50, 20 and 7% for males (juvenile, sub-adult and adult respectively), and mortality rate of 16, 5 and 3% per age class (female) or 15, 3 and 1% (male), the offtake after one year represented 12.7% of the camel stock in the country, i.e. 8,021 tons of camel meat and 74.9 million liters of milk. By improving the mortality rate of juvenile age class (8 and 7% for female and male respectively), the offtake was 12.8 %, i.e. 9,713 tons of camel meat and 76.7 million liters of milk. According to the mean live weight in each age class, the dry matter requirements, the carcass yield, the financial values,

the milk offtake, many economic indicators could be available: values of offtake, values of skin and hides, manure production, feed requirements. For example, with the parameters given above, the feed requirements were 1,173 million tons of dry matter at the national level.
Such applications are useful for decision-making both to manage farms (for example by foreseeing the expected incomes) and to assess the economic place of camel farming in a country. Other applications are available according to the objectives of the decision makers (Lesnoff, 2013).

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THE U.S. ARMY CAMEL EXPERIMENT

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Abstract

The U.S. Army Camel Experiment is a short documentary film that illustrates the unique episode in history that includes the use of camels as pack animals for military purposes in the 19th century American Southwest. The six-minute and twenty-three second film uses narration, original footage of reenacted events, historic images, and documents to tell the story. Major expeditions using camels are highlighted and the politics and events of the day precipitating the project are explained spanning a timeline that includes the Gold Rush, the U.S. Civil War, and the coming of the railroad. The documentary is currently being shown at numerous historic sites relevant to the camels' story throughout the Western U.S. and is used as an educational resource in social studies and history classes across the United States.

АҚШ ӘСКЕРІНДЕГІ ТҮЙЕЛЕР

АҚШ әскеріндегі түйелер, 19 ғасырда оңтүстік-батыс Америкада түйелерді әскери мақсатта қоладылғаны жөніндегі тарихи эксклюзивті эпизодтардан тұратын қысқа документальді фильм. Фильмде алты минут жиырма үш секунд аралығында тарихты баяндайдын шынайы суреттер мен құжаттар, оқиғалар баяндалады. Түйелерді пайдалана отырып арнайы экпедициялар құрылып, саяси құжаттарды пайдалана отырып АҚШтағы Азаматтық соғыс жылдары мен темір жолдың келуі сияқты жобалар қамтылған. Бұл фильм АҚШтың батыс бөлігінде түйелердің тарихымен байланысты көптеген тарихи жерлерде көрсетілген және де ҚҰРАМА Штаттың барлық жерлерінде әлеуметтік зерттеулер мен тарих сабақтарында білім беру ресірстары ретінде қолданылады.

АРМИЯ США ЭКСПЕРИМЕНИРУЕТ ВЕРБЛЮДОВ

Короткий документальный фильм *Армия США экспериментирует верблюдов*, который иллюстрирует уникальный эпизод в истории, которая включает использование верблюдов в качестве вьючных животных в военных целях в 19 веке юго-запада Америки. Шесть минут и двадцать три секунды в фильме использованы повествование, оригинальные кадры показывает события, исторические изображения и документы, рассказывающий историю. Выделены основные экспедиции с использованием верблюдов и политика и события дня, выпадающие проект объясняются охватывающих график, который включает в золотой лихорадки Гражданской войны в США, и приход железной дороги. Документальный фильм в настоящее время показано на многочисленных исторических местах, связанных с историей верблюдов всей западной части США и используется в качестве образовательного ресурса в социальных исследований и уроков истории на всей территории Соединенных Штатов.

ASSESSMENT AND IMPROVING CAMEL MILK PRODUCTION AND MARKETING IN SOME ARAB COUNTRIES: A SOCIO-ECONOMICAL OVERVIEW

Elbasheer M. H. M.[1], Agab H.[2], Khalafalla A. I.[3], Alsahnoon A.[4], Sait Z.[5].

Abstract

The Arab Centre for the Studies of Arid Zones and Dry Lands (ACSAD) has implemented a project aimed at identifying, prioritizing and introducing the interventions needed to improve camel milk production, processing and marketing in the traditional dromedary pastoralists and communities in three Arab countries (namely; Sudan, Morocco and Algeria) during 2011 - 2013.
After conducting a socio-economical assessment of camel milk supply chains, the project has made some interventions in Sudan and Morocco included provision of camel milk pasteurizing machines, feed supplements, feed processing facilities, milk cooling and storage utensils, disease control packages as well as sensitizing breeder's village groups and organizing local vendors. The interventions also included offering and conduction of workshops, training courses and field days